Space Weather Highlights
02 July - 08 July 2018

SWPC PRF 2236
09 July 2018

Solar activity was very low levels through most of the reporting period. However, on 06 Jul, A C1 flare was observed at 06/2007 UTC from an area of enhanced flux, as observed in STEREO AHEAD 195 imagery, from around the E. limb. The area later rotated onto the visible disk as spotless plage. Several DSFs were observed on 05 Jul from the NE quadrant, though none were thought to have produced Earth-directed CMEs.

A coronal dimming in the SW quadrant was observed in SDO/AIA 193, around 04/2325 UTC, which was followed by an observation of a slow-moving CME first observed in STEREO AHEAD COR2 imagery beginning around 04/0324 UTC. No clear signature was observed in SOHO LASCO C2 or C3 imagery. Modeling of the event suggested the possibility of an Earth-directed component becoming geoeffective sometime after 09 Jul.

No proton events were observed at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit was at moderate to high levels on 02-04 Jul and decreased to normal to moderate levels on 05-08 Jul.

Geomagnetic field activity ranged from quiet to G1 (Minor) geomagnetic storm levels. Quiet conditions were observed from 02-04 Jul. A SSBC on 05 Jul increased total magnetic field strength to 12 nT and solar wind speeds to around 450 km/s. The field response increased from quiet to an isolated period of G1 (Minor) storm levels. Wind speeds continued between 400-525 km/s for the remainder of the reporting period; however, only quiet conditions were observed after 06/0300 UTC.

Space Weather Outlook
09 July - 04 August 2018

Solar activity is expected to be at very low levels throughout the outlook period.

No proton events are expected at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit is expected to range from normal to high levels. Normal to moderate levels are expected from 09-20 Jul and 01-04 Aug; moderate to high levels are expected from 21-31 Jul. All enhancements in electron flux are anticipated in response to recurrent CH HSSs.

Geomagnetic field activity is expected to range from quiet to G1 (Minor) geomagnetic storm levels. A slow-moving CME, first observed early on 05 Jul, is forecast to cause active levels on 09 Jul and unsettled levels on 10 Jul. Influences from multiple, recurrent, CH HSSs are expected to increase geomagnetic activity to unsettled levels on 16 Jul, 21 Jul and 24 Jul; active levels are likely on 15 Jul, 20 Jul, 22 Jul; G1 (Minor) storm levels are likely on 23 Jul. The remainder of the forecast period is expected to produce quiet levels under nominal solar wind conditions.

Daily Solar Data

Date	Radio Flux 10.7cm	Sun spot No.	Sunspot Area (10^{-6} hemi.)	X-ray Background Flux	Flares						
					X-ray			Optical			
					C	M	X	S	1	2	3	4
02 July	67	0	0	A1.5	0	0	0	0	0	0	0	0
03 July	68	0	0	A1.4	0	0	0	0	0	0	0	0
04 July	68	0	0	A1.0	0	0	0	0	0	0	0	0
05 July	68	0	0	A0.0	0	0	0	0	0	0	0	0
06 July	71	0	0	A1.8	1	0	0	0	0	0	0	0
07 July	72	0	0	A3.7	0	0	0	0	0	0	0	0
08 July	72	0	0	A3.7	0	0	0	0	0	0	0	0

Daily Particle Data

Date	Proton Fluence (protons/cm ^{2} -day -sr)			Electron Fluence (electrons/cm^2 -day -sr)		
	>1 MeV	>10 MeV	>100 MeV	>0.6 MeV	>2MeV	>4 MeV
02 July	1.7e+06	1.9e+04		3.8e+03	2.3e+08	
03 July	2.2e+06	1.8e+04		3.9e+03	2.0e+08	
04 July	1.8e+06	1.9e+04		3.8e+03	6.2e+07	
05 July	1.2e+06	1.9e+04		3.8e+03	1.8e+07	
06 July	1.2e+06	2.0e+04		3.9e+03	5.8e+06	
07 July	8.6e+05	1.9e+04		3.8e+03	9.2e+06	
08 July	8.3e+05	1.8e+04		3.7e+03	1.3e+07	

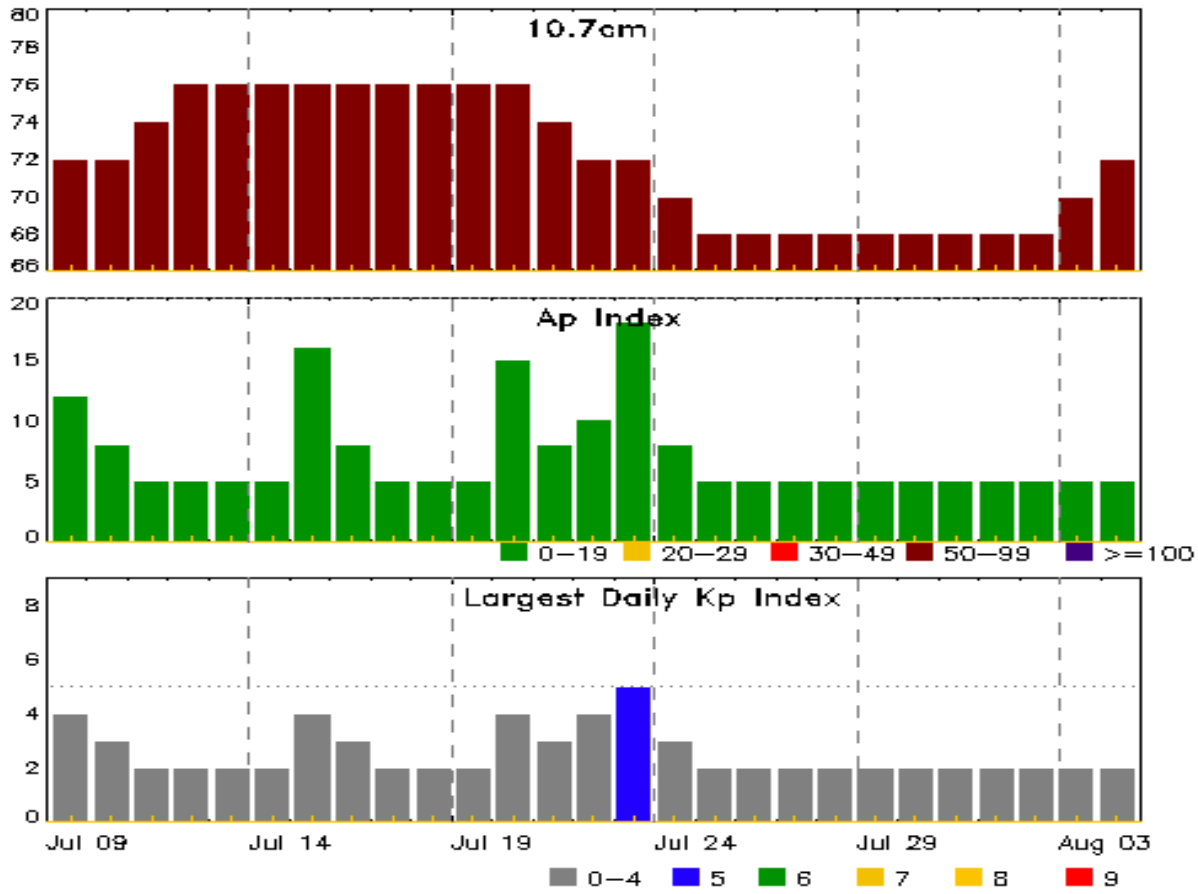
Daily Geomagnetic Data

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
02 July	4	1-1-0-1-2-2-2-1	0	0-1-0-0-0-0-0-0	3	1-1-1-1-1-1-1-0
03 July	5	1-1-0-2-2-2-2-1	2	0-0-0-0-1-2-1-1	4	0-1-1-1-1-2-1-1
04 July	4	1-1-1-1-2-2-1-1	5	0-2-2-1-3-1-1-0	5	1-1-2-1-2-1-1-1
05 July	11	2-1-0-2-3-3-4-3	13	2-1-1-2-4-4-3-3	17	2-1-1-2-3-4-5-4
06 July	8	3-2-2-2-2-1-2-2	8	2-3-1-3-3-1-1-1	7	3-2-1-2-2-1-1-2
07 July	6	2-2-1-2-2-2-2-1	4	2-2-2-1-1-1-1-0	5	2-2-1-2-1-1-2-0
08 July	6	1-1-1-2-3-1-1-2	2	1-1-1-1-1-0-0-1	4	1-1-1-1-1-1-1-1

Alerts and Warnings Issued

Date & Time of Issue UTC	Type of Alert or Warning	Date & Time of Event UTC
02 Jul 0900	CONTINUED ALERT: Electron 2MeV Integral Flux >= 1000pfu	24/1800
03 Jul 0859	CONTINUED ALERT: Electron 2MeV Integral Flux >= 1000pfu	24/1800
04 Jul 1623	CONTINUED ALERT: Electron 2MeV Integral Flux >= 1000pfu	24/1800
05 Jul 1311	WARNING: Geomagnetic K = 4	05/1310 - 2100
05 Jul 1800	ALERT: Geomagnetic K = 4	05/1754
05 Jul 1832	WARNING: Geomagnetic K = 5	05/1832 - 2300
05 Jul 1946	ALERT: Geomagnetic K = 5	05/1936
05 Jul 1952	EXTENDED WARNING: Geomagnetic K = 4	05/1310 - 06/0300
06 Jul 0255	EXTENDED WARNING: Geomagnetic K = 4	05/1310 - 06/1200

Twenty-seven Day Outlook



Date	Radio Flux 10.7cm	Planetary A Index	Largest Kp Index	Date	Radio Flux 10.7cm	Planetary A Index	Largest Kp Index
09 Jul	72	12	4	23 Jul	72	18	5
10	72	8	3	24	70	8	3
11	74	5	2	25	68	5	2
12	76	5	2	26	68	5	2
13	76	5	2	27	68	5	2
14	76	5	2	28	68	5	2
15	76	16	4	29	68	5	2
16	76	8	3	30	68	5	2
17	76	5	2	31	68	5	2
18	76	5	2	01 Aug	68	5	2
19	76	5	2	02	68	5	2
20	76	15	4	03	70	5	2
21	74	8	3	04	72	5	2
22	72	10	4				

Energetic Events

	Time			X-ray		Optical Information			Peak Radio Flux		Sweep Freq Intensity	
Date	Begin	Max	Half Max	Class	Integ Flux	Imp/ Brtns	Location Lat CMD	Rgn #	245	2695	II	IV

No Events Observed

Flare List

	Time				Optical		
Date	Begin	Max	End	X-ray Class	Imp/ Brtns	Location Lat CMD	Rgn #
06 Jul	1941	2007	2042	C1.6			
07 Jul	0447	0451	0500	B1.2			
07 Jul	1159	1204	1212	B1.3			
07 Jul	2125	2128	2130	B1.0			
07 Jul	2131	2135	2142	B1.0			
08 Jul	0246	0249	0251	B1.0			

Region Summary

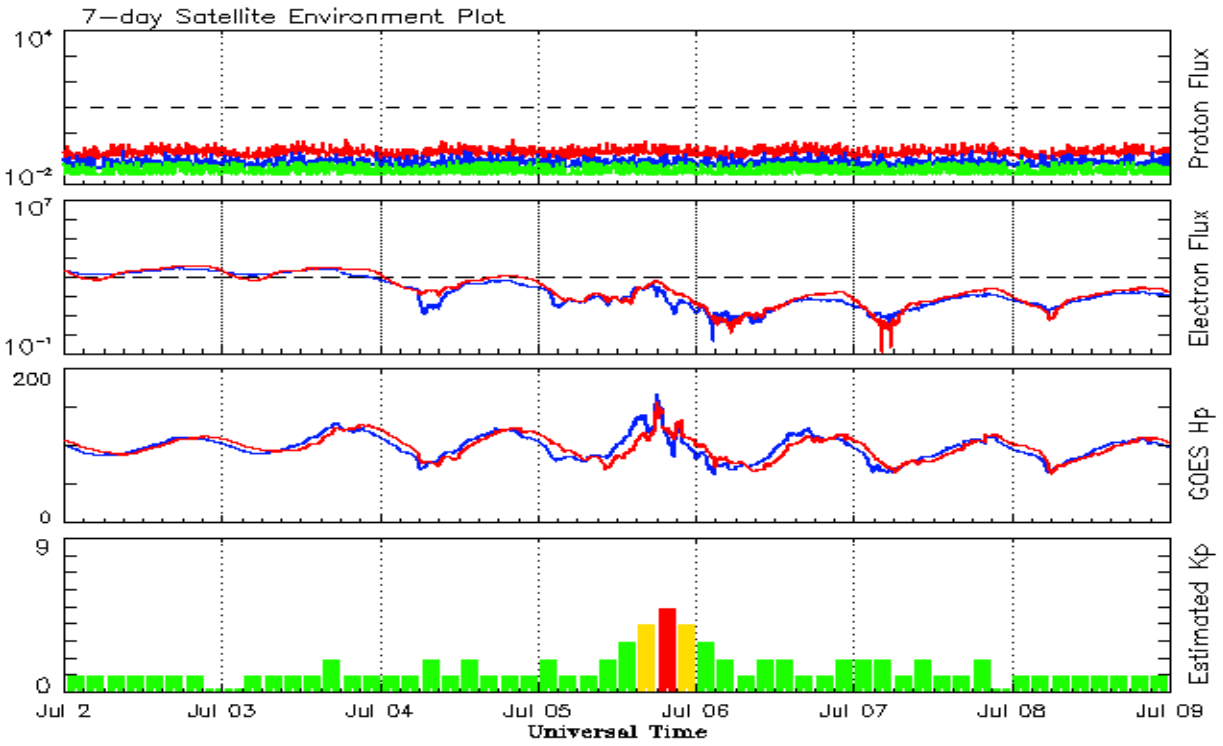
	Location		Sunspot Characteristics					Flares							
		Helio	Area	Extent	Spot	Spot	Mag	X-ray			Optical				
Date	Lat CMD	Lon	10^{-6} hemi.	(helio)	Class	Count	Class	C	M	X	S	1	2	3	4

No Active Regions

Recent Solar Indices (preliminary)
Observed monthly mean values

	Sunspot Numbers					Radio Flux		Geomagnetic	
	Observed values		Ratio	Smooth values		Penticton	Smooth	Planetary	Smooth
Month	SEC	RI	RI/SEC	SEC	RI	10.7 cm	Value	Ap	Value
				2016					
July	36.8	19.4	0.53	36.5	23.1	85.9	87.7	10	11.2
August	50.4	30.1	0.60	34.2	21.6	85.0	85.5	10	11.2
September	37.4	26.8	0.72	32.1	19.9	87.8	83.7	16	11.3
October	30.0	20.0	0.67	31.1	18.9	86.1	82.5	16	11.6
November	22.4	12.8	0.57	29.4	17.9	78.7	81.1	10	11.6
December	17.6	11.1	0.64	28.1	17.1	75.1	80.0	10	11.4
				2017					
January	28.1	15.7	0.55	27.3	16.7	77.4	79.4	10	11.3
February	22.0	15.8	0.71	25.5	15.9	76.9	78.7	10	11.3
March	25.4	10.6	0.42	24.6	15.4	74.6	78.6	15	11.5
April	30.4	19.4	0.64	24.3	14.9	80.9	78.4	13	11.5
May	18.1	11.3	0.62	23.1	14.0	73.5	77.7	9	11.3
June	18.0	11.5	0.64	22.0	13.3	74.8	77.3	7	11.3
July	18.8	10.7	0.59	20.8	12.6	77.7	76.8	9	11.0
August	25.0	19.6	0.80	19.7	11.8	77.9	76.3	12	10.7
September	42.2	26.2	0.62	18.6	11.0	92.0	75.9	19	10.3
October	16.0	7.9	0.49	16.8	10.0	76.4	75.1	11	9.8
November	7.7	3.4	0.44	15.7	9.2	72.1	74.6	11	9.5
December	7.6	4.9	0.64	15.7	9.1	71.5	74.4	8	9.4
				2018					
January	7.8	4.1	0.51			70.0		6	
February	16.0	6.4	0.40			72.0		7	
March	6.0	1.5	0.25			68.4		8	
April	7.0	5.3	0.76			70.0		7	
May	15.0	7.9	0.53			70.9		8	
June	19.7	9.5	0.48			72.5		7	

Note: Values are final except for the most recent 6 months which are considered preliminary. Cycle 24 started in Dec 2008 with an RI=1.7.



Weekly Geosynchronous Satellite Environment Summary
Week Beginning 02 July 2018

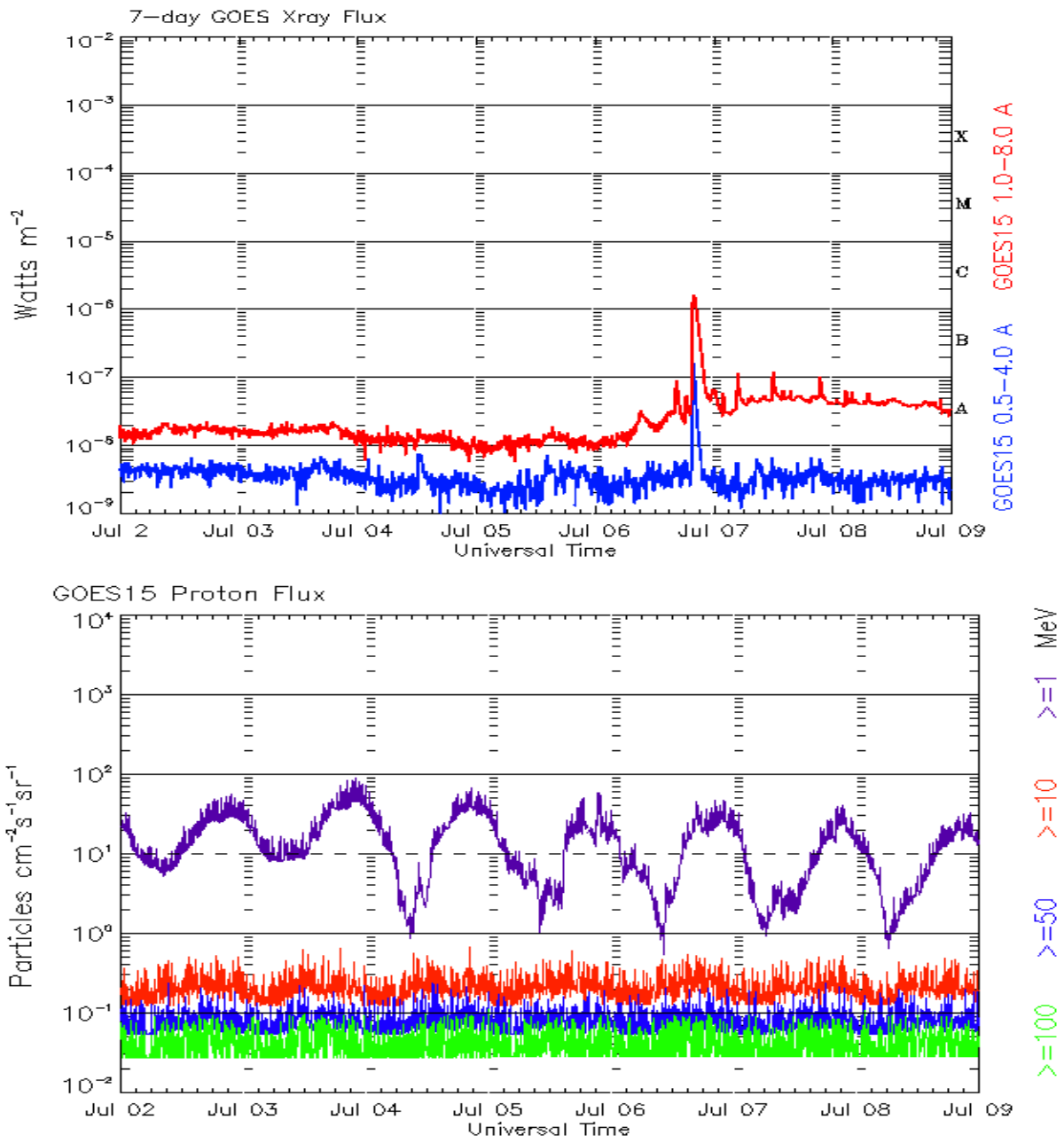
The proton flux plot contains the five-minute averaged integral proton flux (protons/cm^2-sec -sr) as measured by the SWPC Primary GOES satellite, near West 75, for each of three energy thresholds: greater than 10, 50, and 100 MeV.

The electron flux plot contains the five-minute averaged integral electron flux (electrons/cm^2-sec -sr) with energies greater than 2 MeV by the SWPC Primary GOES satellite.

The Hp plot contains the five minute averaged Hp magnetic field component in nanoteslas (nT) as by the SWPC Primary GOES satellite. The Hp component is parallel to the spin axis of the satellite, which is nearly parallel to the Earth's rotation axis.

The Estimated 3-hour Planetary Kp-index is derived at the NOAA Space Weather Prediction Center using data from the following ground-based magnetometers: Boulder, Colorado; Chambon la Foret, France; Fredericksburg, Virginia; Fresno, California; Hartland, UK; Newport, Washington; Sitka, Alaska. These data are made available thanks to the cooperative efforts between SWPC and data providers around the world, which currently includes the U.S. Geological Survey, the British Geological Survey, and the Institut de Physique du Globe de Paris.

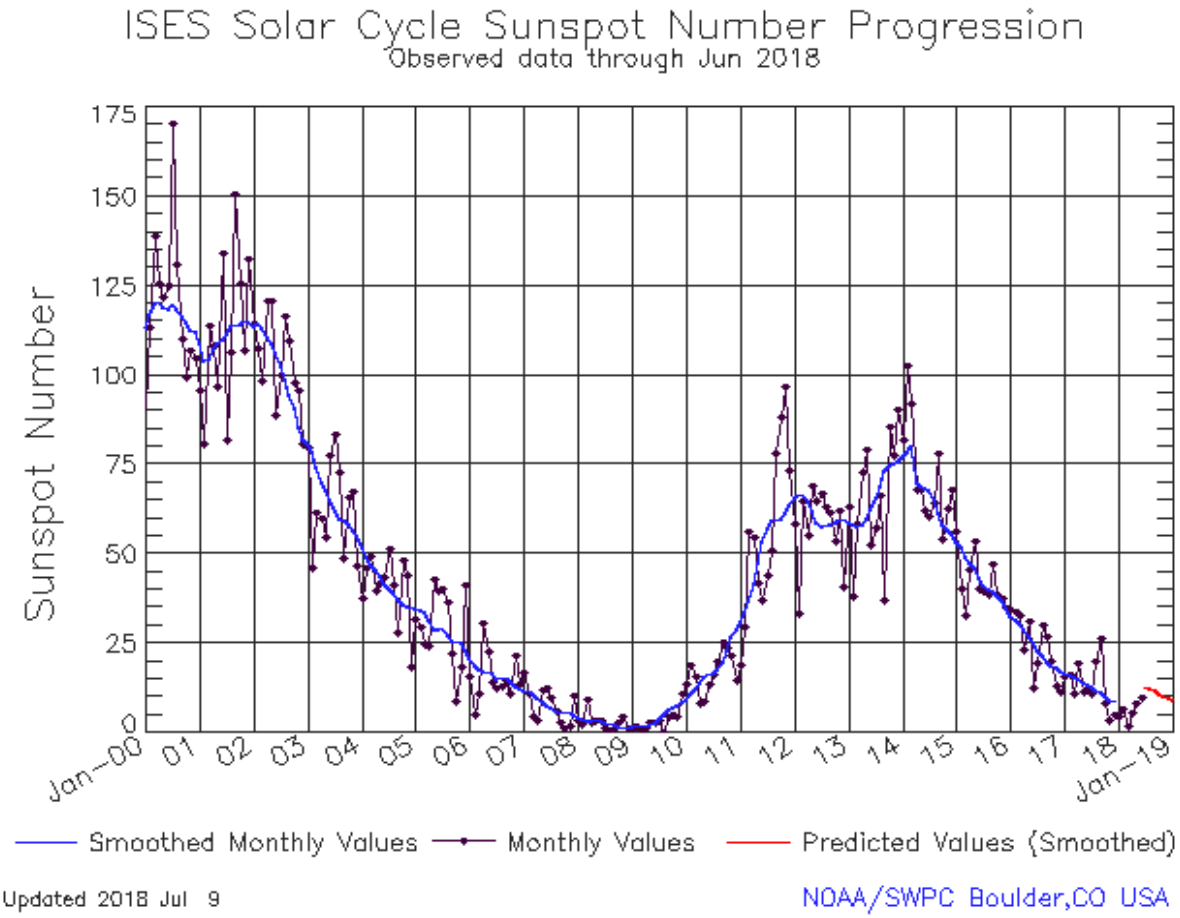
The data included here are those now available in real time at the SWPC and are incomplete in that they do not include the full set of parameters and energy ranges known to cause satellite operating anomalies. The proton and electron fluxes and Kp are 'global' parameters that are applicable to a first order approximation over large areas. H parallel is subject to more localized phenomena and the measurements generally are applicable to within a few degrees of longitude of the measuring satellite.



Weekly GOES Satellite X-ray and Proton Plots
Week Beginning 02 July 2018

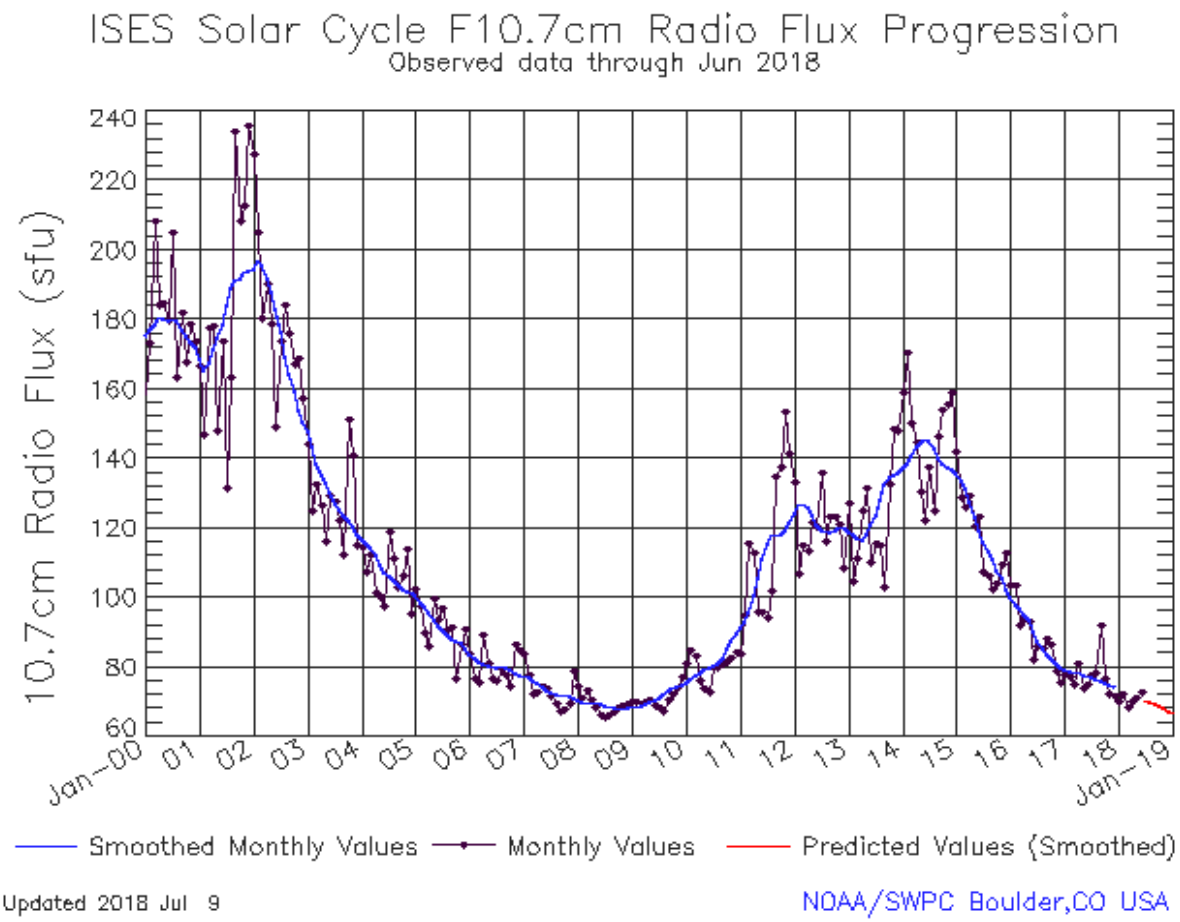
The x-ray plots contains five-minute averages x-ray flux (Watt/m^2) as measure by the SWPC primary GOES X-ray satellite, usually at West 105 longitude, in two wavelength bands, 0.05 - 0.4 and 0.1 - 0.8 nm. The letters A, B, C, M and X refer to x-ray event levels for the 0.1 - 0.8 nm band.

The proton plot contains the five-minute averaged intergral flux units (pfu = protons/cm^2 -sec -sr) as measured by the primary SWPC GOES Proton satellite for each of the energy thresholds: >1, >10, >30, and >100 MeV. The P10 event threshold is 10 pfu at greater than 10 MeV.



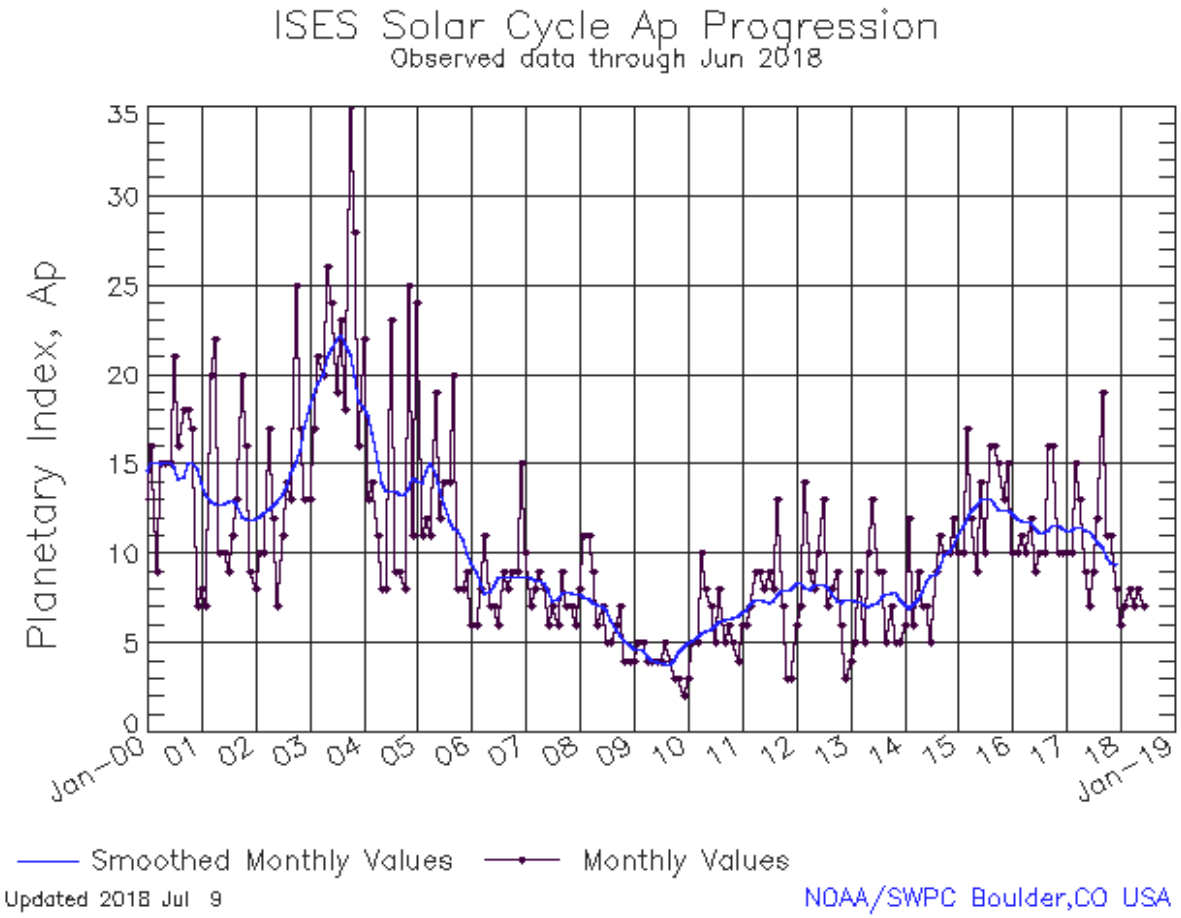
Smoothed Sunspot Number Prediction

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2010	9	10	11	13	15	16	17	17	20	23	27	29
	(1)	(2)	(3)	(5)	(5)	(6)	(7)	(7)	(8)	(9)	(9)	(10)
2011	19	30	56	54	42	37	44	51	78	88	97	73
	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)
2012	58	33	64	55	69	65	67	63	61	53	62	41
	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)
2013	63	38	58	72	79	53	57	66	37	86	78	90
	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)
2014	82	102	92	68	68	62	60	64	78	54	62	68
	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)
2015	56	40	33	45	53	40	40	39	47	38	37	35
	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)
2016	34	34	33	23	31	12	19	30	27	20	13	11
	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)
2017	16	16	11	19	11	12	11	20	26	8	3	5
	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)
2018	4	6	2	5	8	10	13	12	12	11	10	10
	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)
2019	9	8	8	7	7	6	6	6	5	5	4	4
	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)



Smoothed F10.7cm Radio Flux Prediction

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2010	76	77	78	78	79	80	80	81	82	85	88	90
	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)
2011	91	93	96	100	106	111	115	118	118	118	120	122
	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)
2012	124	127	127	126	124	121	120	119	119	119	120	120
	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)
2013	119	118	117	117	118	121	124	128	132	135	135	136
	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)
2014	137	139	141	144	145	146	145	143	140	138	137	137
	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)
2015	136	134	131	127	123	120	116	113	111	108	105	103
	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)
2016	100	98	97	95	93	90	88	86	84	83	81	80
	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)
2017	79	79	79	78	78	77	77	76	76	75	75	74
	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)
2018	74	73	72	71	70	70	70	69	69	69	68	68
	(1)	(1)	(2)	(3)	(4)	(4)	(5)	(6)	(7)	(8)	(8)	(9)
2019	67	66	66	65	65	65	64	64	63	63	63	63
	(9)	(9)	(9)	(9)	(9)	(9)	(9)	(9)	(9)	(9)	(9)	(9)



Solar Cycle Comparison charts are temporarily unavailable.

Preliminary Report and Forecast of Solar Geophysical Data (The Weekly)

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Notice: The 27-day Outlook, Satellite Environment, X-ray and Proton plots have been redesigned. Comments and suggestions are welcome SWPC.Webmaster@noaa.gov

The Weekly has been published continuously since 1951 and is available online since 1997.

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